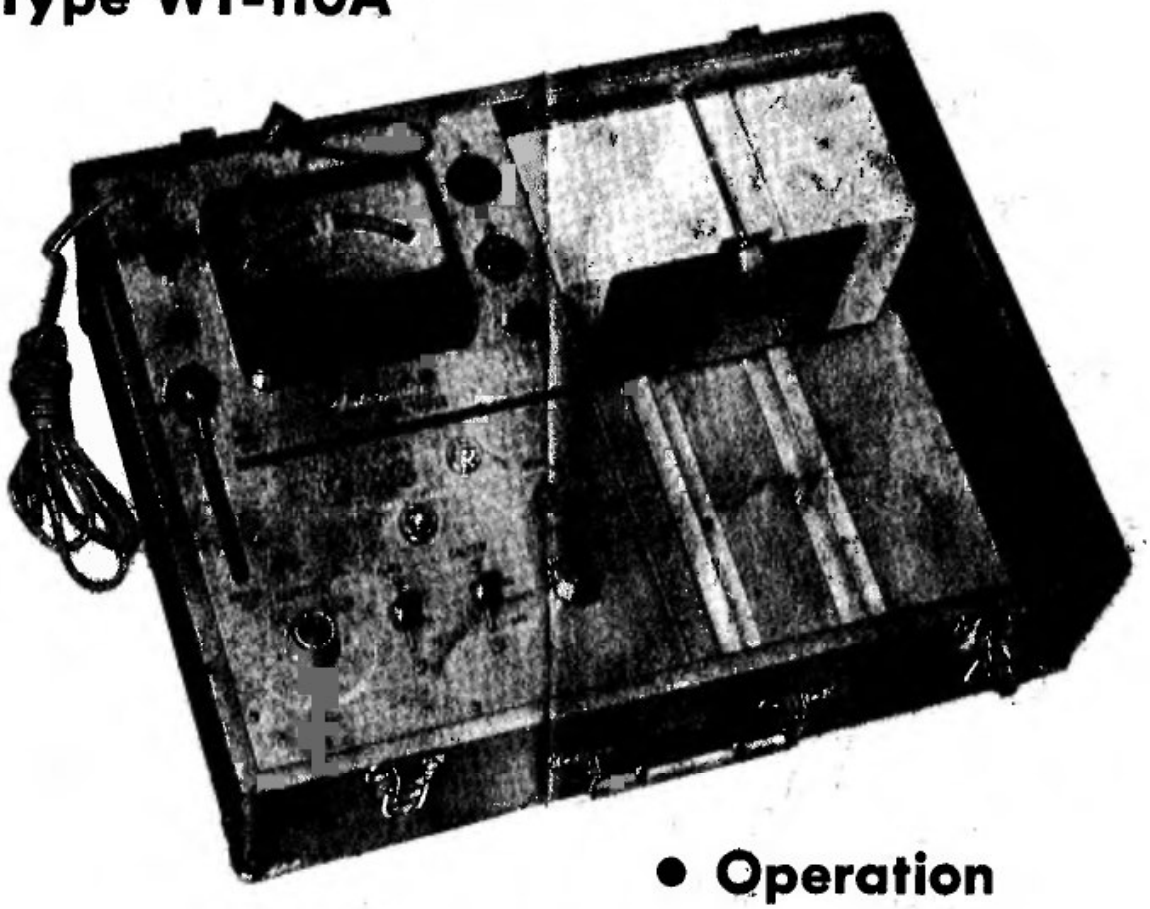
PRICE 75 CENTS

RCA *Automatic* ELECTRON-TUBE TESTER

Type WT-110A



- Description
- Operation
- Maintenance

RADIO CORPORATION of AMERICA
ELECTRON TUBE DIVISION HARRISON, N. J.

Safety Precautions

The metal panel of this instrument is connected to the ground of the internal circuit. An important point to remember is that there is always danger inherent in working with electrical circuits which operate at hazardous voltages. Therefore, the operator should thoroughly familiarize himself with the circuit under test, bearing in mind that high voltages may appear at unexpected points in defective equipment. Additional precautions which the operator should observe are listed below.

1. It is good practice to remove power before connecting test leads to high-voltage points. If this is impractical, be *especially careful* to avoid accidental contact with equipment racks and other objects which can provide a ground. Working with one hand in your pocket and standing on a properly insulated floor lessens the danger of shock.

2. Filter capacitors may store a charge large enough to be hazardous. Therefore, discharge filter capacitors before attaching test leads.

3. Remember that leads with broken insulation provide the additional hazard of high voltages appearing at exposed points along the leads. Check test leads for frayed or broken insulation before working with them.

4. To lessen the danger of accidental shock, disconnect test leads immediately after test is completed.

5. Remember that the risk of severe shock is only one of the possible hazards. Even a minor shock can place the operator in hazard of more serious risks such as a bad fall or contact with a source of higher voltage.

6. The experienced operator continuously guards against injury and does not work on hazardous circuits unless another person is available to assist in case of accident.

ITEMS

Supplied with WT-110A

1 Set of Punched Cards
1 Master Punched Card
1 Test Card
1 Instruction Booklet
1 Warranty Registration Card

Instr. WT-110A 9-57
Printed in U.S.A.

Description

The RCA WT-110A *Automatic* Electron-Tube Tester is designed to test all popular receiving tubes for general quality, including interelectrode shorts and leakage. Shorts and leakage indications are provided by a neon lamp. The general-quality test is based on measurement of the transconductance of the tube. Readings are provided in terms of "RENEW-?-GOOD" on a 4½-inch meter. The gas condition of the tube is also indicated on the meter.

The outstanding feature of the WT-110A is the use of an individual punched card for each different tube type to automatically set up all tube-pin and test-voltage connections when the card is inserted into the panel slot of the tester. It is not necessary to adjust external switches or other controls to set up pin and operating-voltage connections for the tube.

A set of pre-punched cards for 7-pin and 9-pin miniature, octal-, and loctal-type receiving tubes is supplied with the WT-110A. The cards, made of durable plastic, are permanently hinged in the case adjacent to the tester and are indexed in numerical-alphabetical sequence by tube type. The punched-card system used in the WT-110A accommodates the popular receiving-tube types employed in television and radio receivers, including diodes, triodes, tetrodes, pentodes, and multiunit receiving tubes which have similar and dissimilar units. The WT-110A can also be used to check certain industrial types. The permanently attached punched-card file can be easily disengaged to permit the addition or removal of individual cards.

Testing of tube types not included in the card file is provided for in two ways. Accessory punched cards are available in packages of 24 cards. Individual test cards also may be prepared and punched by the operator. An accessory package of 24 blank cards (RCA WG-325A Accessory Unpunched Cards) and the RCA WG-326A Accessory Card Punch are available on separate order to permit the simple and quick preparation of additional test cards. Card punching information on additional types is readily obtainable from the Radio Corporation of America.

Special provisions are included for making high-resistance interelectrode leakage and low-value gas-current tests on certain tube types. These special provisions make possible a better evaluation of tube types used in applications having critical leakage or gas limitations.

Other features of the RCA WT-110A *Automatic* Electron-Tube Tester include a front panel calibration control to permit compensation for above- or below-normal line voltage, easily replaceable screw-mounted tube sockets, and steel pin-straighteners mounted on the front panel.

The WT-110A is designed for general service and testing use by skilled or unskilled personnel. The unit is housed in an attractive blue plastic-covered case with detachable cover. The panel is satin-finished aluminum. Weight of the instrument, with cards, is approximately 25 pounds. The unit measures 17¼" w x 13¼" d x 6⅝" h. Power consumption is approximately 50 watts.

Operation

General

Always make sure that the correct punched card is inserted in the WT-110A for the tube under test. Failure to observe this precaution may result in damage to the tube or the WT-110A.

When a punched card is inserted into the slot and the lever pulled down, power is automatically applied to the WT-110A and to the tube under test. Since no other power switch is provided, disengage the lever and remove the punched card from the card slot upon completion of tube testing. Do not operate the tester with a tube installed for an extended period of time.

Tube types which have the same basic type designation but which have different suffixes have essentially the same electrical characteristics. For example, the RCA-6SN7-GTA and the RCA-6SN7-GTB are different versions of the prototype RCA-6SN7-GT, and utilize the same punched card for testing. Tube types such as the RCA-6BQ6-GT, 6BQ6-GTB/6CU6, which carry two basic type designations ("double-branded" types), are listed in the card file under type designations 6BQ6-GT and 6CU6. Either card may be used to test the tube.

Two punched cards are required for complete testing of multiunit types having dissimilar units. An example of such a type is the RCA-6AV6 Twin Diode—High-Mu Triode. One card is required for the triode section and one for the two diode sections. Only one card is required for testing the two diode units because the diode units in this tube are similar. The indices of the two cards for the 6AV6 are printed as follows: (first card) "6AV6 DIODE SECTION — 1 OF 2 CARDS" and (second card) "6AV6 TRIODE SECTION — 2 OF 2 CARDS". Instructions for testing multiunit tube types which have similar units are given under "General Testing Procedure". Note that with multiunit tubes, each unit is checked individually, not simultaneously in parallel.

Miniature tubes which have bent pins may be repaired by inserting them into the appropriate steel pin-straightening sockets located on the panel.

The plastic cards may be cleaned by washing them with a mild solution of soap and water.

Complete Testing Procedure

A complete tube test with the WT-110A includes tests for shorts and leakage, gas, and quality. A tube is tested as follows (see Figure 1):

1. Locate the appropriate card in the punched-card file and slide the card along the metal rod to a point opposite the insertion slot (2) in the tester. With the lever (3) in the CARD OUT position, swing the card up to the left and into the slot.

2. Hold the card down in place with the right hand and pull the lever to the CARD IN position with the left hand. If the card is seated correctly, the horizontal line bearing the imprint "Insert card to this line" will be level with

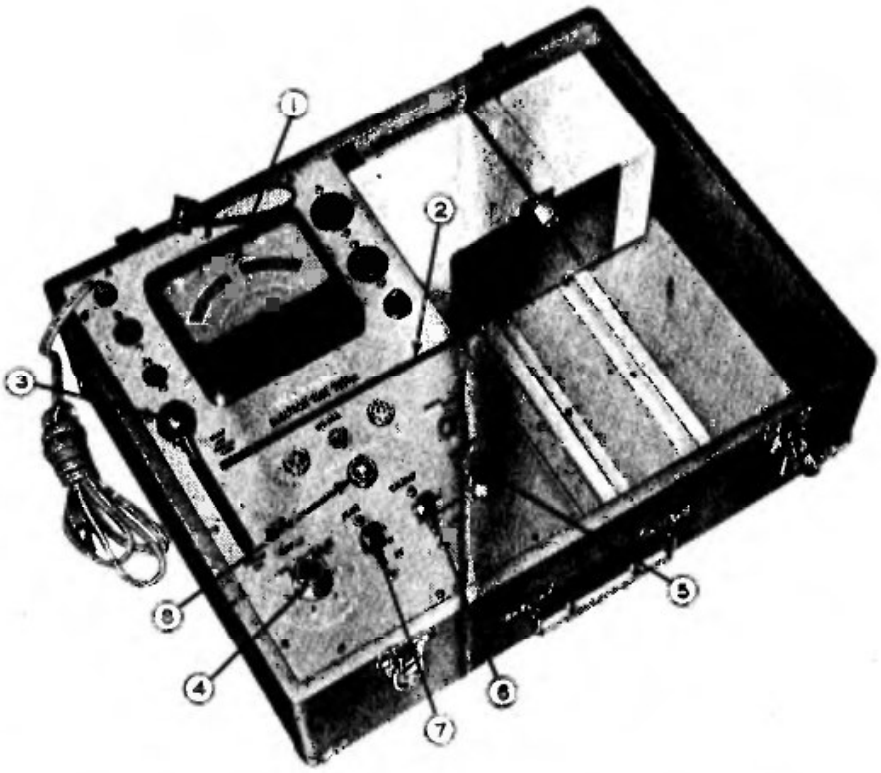


Figure 1. WT-110A *Automatic* Electron-Tube Tester. See text for operating details.

the top of the slot. Power is now applied to the WT-110A and to the tube under test.

3. Insert the tube to be tested into the appropriate test socket.

4. Set the SELECTOR control (4) to the "CAL OR QUALITY" position. Hold the CAL/TEST switch (6) in the "CAL" position and adjust the CALIBRATE control (5) to line up the meter pointer with the center-scale "CAL" line on the meter (1). Release the CAL/TEST switch.

5. Rotate the SELECTOR control clockwise through the four "SHORTS/LEAKAGE" positions while watching the INDICATOR lamp (8). Tap the tube gently while testing in each of the four switch positions. If the lamp glows steadily or flashes while being tapped when the SELECTOR switch is set to any of these four positions, discard the tube without further testing. Brief flashing of the lamp between switch positions does not indicate that the tube is defective. If a multiunit tube is tested, repeat the shorts/leakage test for each of the units, as described in step 7.

6. Rotate the SELECTOR control to the "GAS" position. Note the point on the 0-10 meter scale at which the pointer comes to rest. Move the CAL/TEST lever switch to the "GAS" position. The distance which the meter pointer moves to the right is an indication of the relative amount of gas contained in the tube. Note: Several seconds may be required for the meter to provide a gas reading.

Special Leakage/Gas Test

If a tube type requires a special leakage/gas test, set the SELECTOR control to "GAS", depress the SPECIAL LEAKAGE/GAS pushbutton, then follow the

procedure given in step 6. Depressing the SPECIAL LEAKAGE/GAS pushbutton reduces the bias applied to the tube under test.

It may be necessary to check the leakage resistance of a tube used in some special applications, such as computer or rf circuits, with a more sensitive test than is required for a normal shorts test. Depressing the SPECIAL LEAKAGE/GAS pushbutton increases the sensitivity of the shorts test to 2 megohms.

7. Set the SELECTOR control to the "QUALITY" position and, unless indicated on the punched card, read the quality indication from the red (RENEW), yellow (?), or green (GOOD) section of the meter scale. The quality of some diodes must be read from the 0-10 scale, as indicated in the upper right-hand corner of the card.

A complete test of multiunit tubes which have similar units, such as the RCA-6SN7-GT Medium-Mu Twin Triode and the RCA-6AL5 Twin Diode, requires that each unit be tested individually. Tests of these types utilize only a single punched card. Special testing notations, such as "Test P1 and P2", are contained in the upper right-hand corner of the card.

For example, the RCA-6SN7-GT is tested for shorts and leakage, gas, and quality as described in the foregoing procedure. Because this tube is a twin-unit type, however, it is necessary to test both units for shorts and leakage, and quality. It is sufficient to test only one unit for a complete gas test. The shorts/leakage test and the quality test are made first with the PLATE switch in the "P1" position. These tests are then repeated with the PLATE switch set to the "P2" position. A triple-unit tube having similar units, such as the RCA-6BC7 Triple Diode, is tested in similar manner except that the PLATE switch is set consecutively to the "P1", "P2", and "P3" positions.

A complete test of multiunit tubes which have dissimilar sections, such as the RCA-6AV6 Twin-Diode — High-Mu Triode, requires the use of two punched cards. One card is provided for testing the two diode units; another card is provided for testing the triode unit. A single gas test will indicate the general gas condition of the tube. The shorts/leakage and quality tests must be made for each unit individually, and both punched cards must be used.

Availability of New Punched Cards

The tube types included in the punched-card file supplied with the WT 110A have been selected on the basis of their frequency of use in radio and television receivers. Two methods are provided for keeping the file up-to-date.

Prepunched and printed cards for new tube types may be purchased as they become available through local RCA distributors. Small packages of cards for groups of newer tubes will be made available periodically at reasonable cost. Prepunched cards for individual tube types are not available.

Unpunched blank cards are available in 24-card packages (RCA WG-325A) on separate order to provide for punching of individual cards for newer tube types. This arrangement permits setting up a card as soon as the tube and card-punching information becomes available. A master punched card is provided

with the WT-110A; a special hand punch, RCA WG-326A Accessory Card Punch, is available on separate order.

FOR LATEST INFORMATION ON TEST CARDS, see your local RCA distributor or write to: Commercial Engineering, Radio Corporation of America, Harrison, New Jersey.

How to Prepare Punched Cards

Preparation of a punched card for a particular tube type requires the following items (see Figure 2)

1. Master Card, RCA Stock No. 215426.
2. Unpunched plastic cards, RCA WG-325A Accessory Unpunched Cards (24).
3. Steel hand punch, RCA WG-326A Accessory Card Punch.

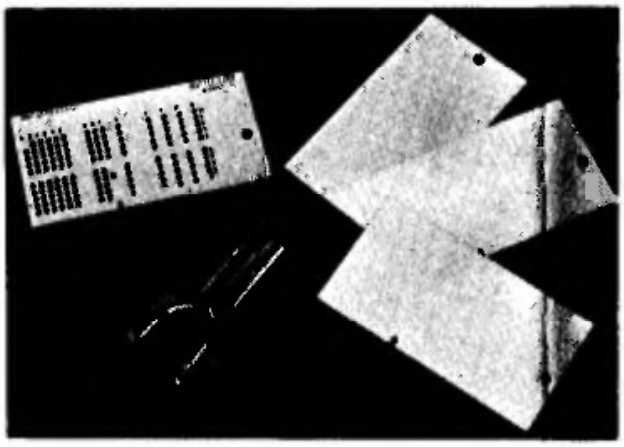


Figure 2. Items required for preparing punched cards. Master punched card is furnished with WT-110A.

A new card is prepared as follows:

1. Place the Master Card on top of a blank card with the hole on the right-hand side of the card.
2. Carefully line up the index slots and the bottom edges of the cards. Clip the two cards together with three or four paper clips around the edges (see Figure 3).

Figure 3. Line up index slots and bottoms of master card and blank card. Clip two cards together.

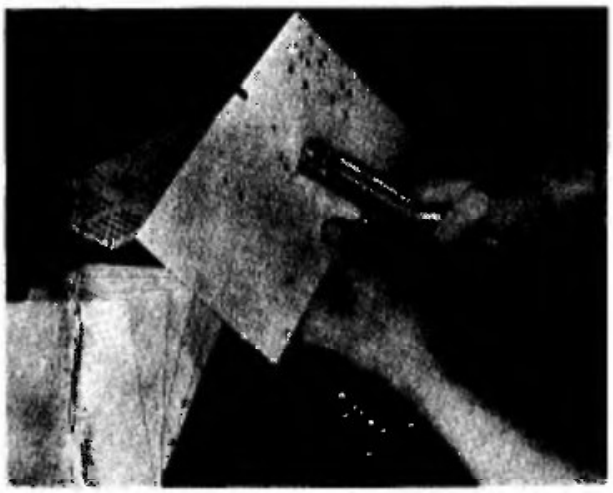
3. With a sharp-pointed pencil, inscribe only those holes called for in the hole-punching instructions through the master card and onto the blank card (see Figure 4).

Figure 4. Use sharp pointed pencil to inscribe hole outlines on blank card.

4. When marking of the blank card is completed, recheck the encircled holes against the hole-punching instructions for the particular tube type.

5. Detach the paper clips and Master Card. Punch out all the penciled circles on the blank card with the WG-326A Accessory Card Punch (see Figure 5). Take care to center the penciled circles exactly in the die by sighting through the hole in the top of the punch.

Figure 5. Center each penciled outline exactly in die on top of punch before punching hole.



Cards are added or removed from the WT-110A Card File by unscrewing the file rod at the front of the case and pushing the rod out through the rear eyelet. Insert or remove the card and reinstall the rod.

Maintenance

Caution: See "Safety Precautions", page 2

General:

If it becomes necessary to replace any of the parts in the WT-110A, use only RCA Replacement Parts or their equivalents. When ordering Replacement Parts, consult the Replacement Parts List in this instruction booklet and specify the code and serial numbers of the instrument as well as the stock number of the replacement part.

To remove the instrument from the case, remove ten screws from the edges of the panel and remove four screws from the right-hand lip in the bottom of the case. Lift the panel to the left and turn it upside down. The chassis is mounted separately in the bottom of the unit.

Meter Mechanical Zero Adjustment

When power is removed from the WT-110A, the meter pointer should rest at the left-hand zero mark. If the pointer comes to rest at a point above or below this mark, reset the zero-adjust screw at the front of the meter with a screw driver to bring the pointer into exact alignment.

Troubleshooting

The contact pins in the matrix are normally shorted when no card is installed in the card slot and the lever is in the "Power Off" position. When a card is installed in the slot and the lever is in the "Power On" position, all contacts except those which line up with the card holes will be opened. Power can only be applied to the WT-110A when a card is inserted and the matrix is closed. Trouble shooting requires use of a special test card, which is included with the WT-110A, and various tube cards, as described later.

If any operational difficulty arises, use the following check-out procedure.

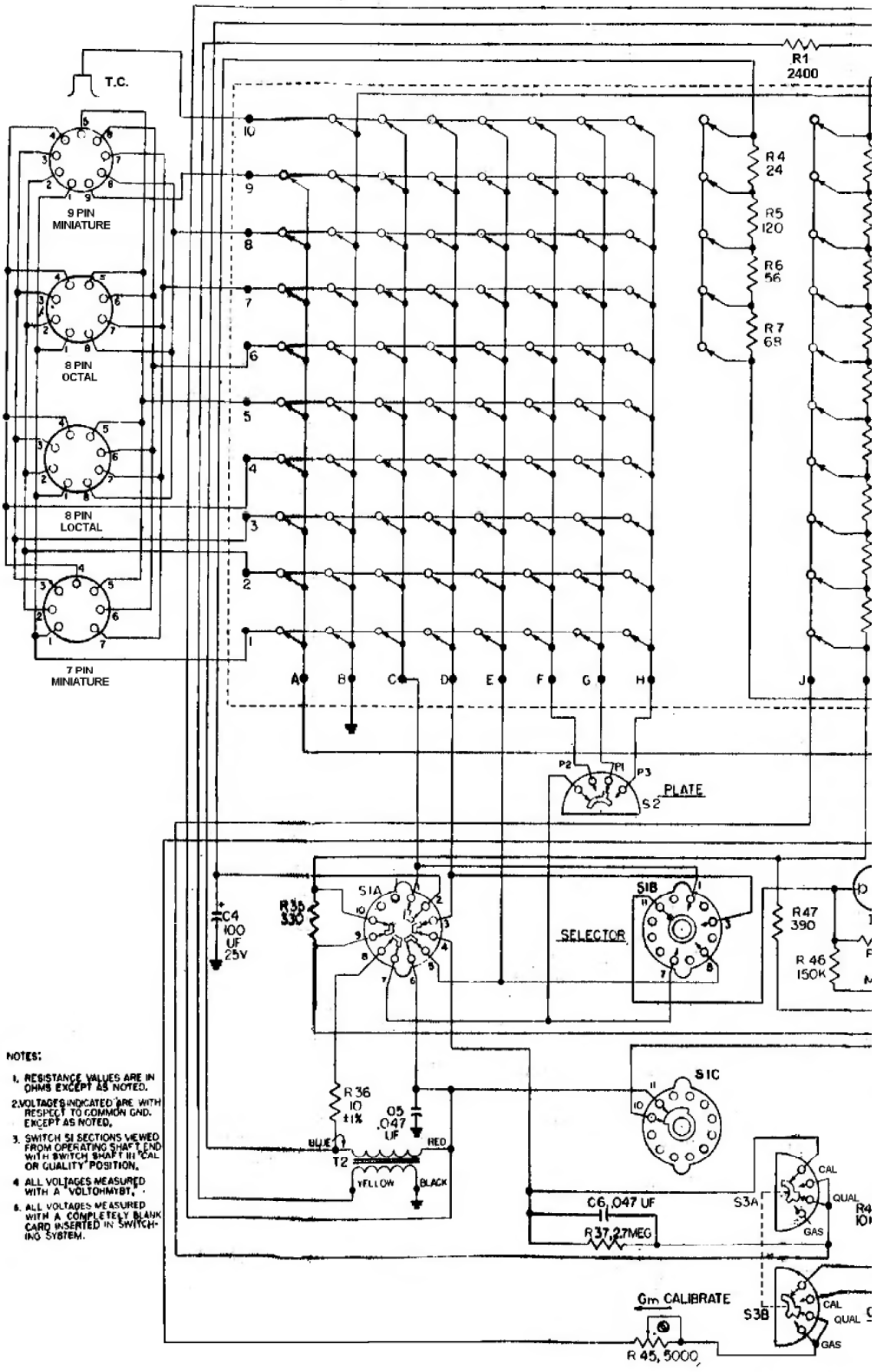
1. Install the special test card and close the matrix. Do not install a tube.

2. Calibrate the WT-110A. If the instrument can be calibrated, the fuse, interlocks, meter, meter rectifier, current transformer, and CALIBRATE potentiometer are functioning correctly. If the WT-110A is calibrated at a line voltage of 110 volts, the pointer on the CALIBRATE control should be in the approximate center of its range and the meter pointer should read between 6 and 7 on the meter scale. If any of these performance conditions are not met, check the parts enumerated above for defects.

If the calibrating circuit is functioning, the internal power-supply voltages can be checked by inserting the cards only for the tube types shown below and measuring the voltages at the indicated tube pins with a VoltOhmyst*. A complete check of all these voltages will provide an overall check of the various power-supply voltages. Voltages are measured to chassis and should be within

(Continued on page 14)

*Trade Mark Reg. U. S. Pat. Off.



NOTES:

1. RESISTANCE VALUES ARE IN OHMS EXCEPT AS NOTED.
2. VOLTAGES INDICATED ARE WITH RESPECT TO COMMON GND. EXCEPT AS NOTED.
3. SWITCH S1 SECTIONS VIEWED FROM OPERATING SHAFT END WITH SWITCH SHAFT IN 'CAL OR QUALITY' POSITION.
4. ALL VOLTAGES MEASURED WITH A 'VOLTOHMYST'.
5. ALL VOLTAGES MEASURED WITH A COMPLETELY BLANK CARD INSERTED IN SWITCHING SYSTEM.

Schematic diagram

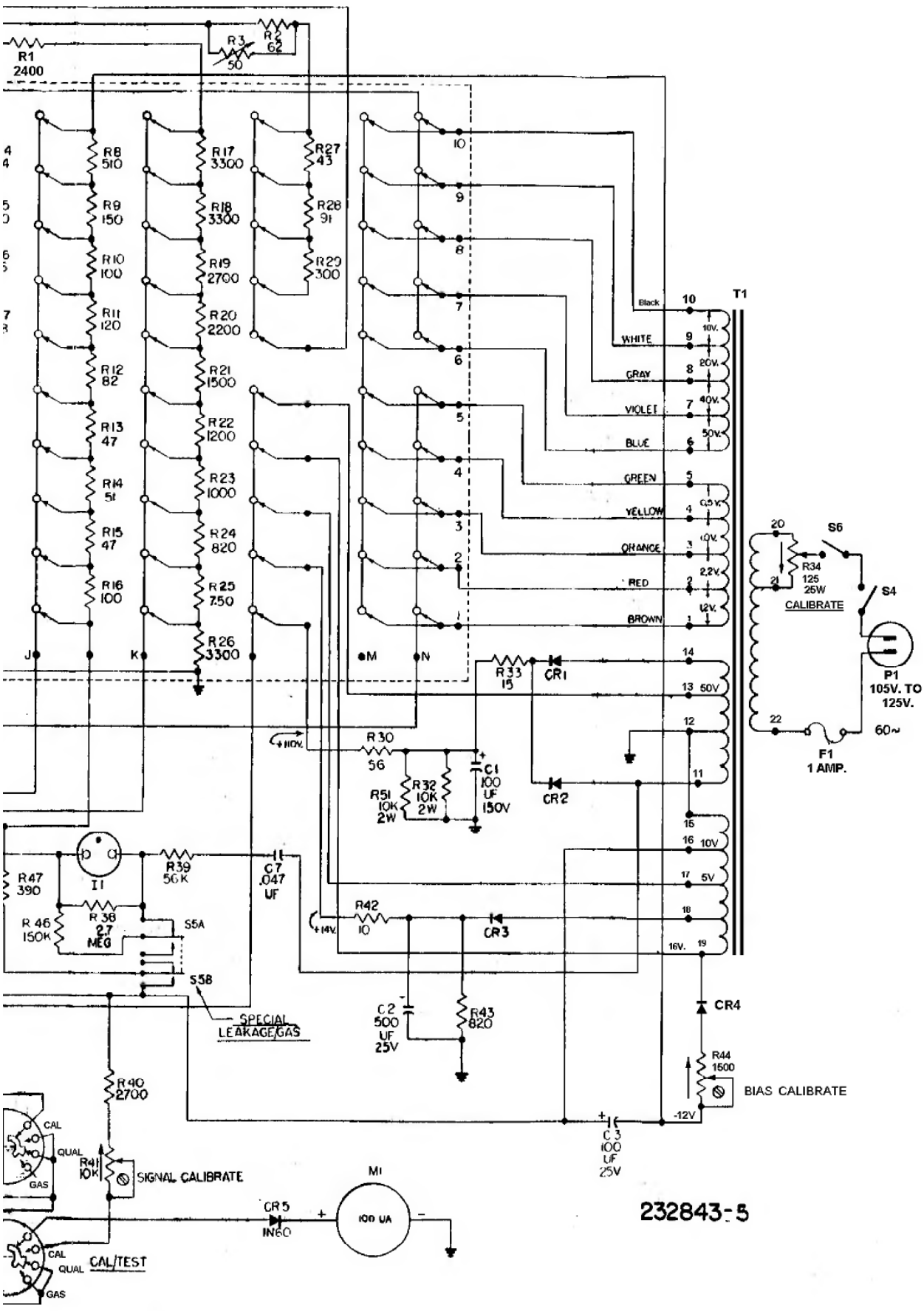


diagram of WT-110A

Replacement Parts List

WT-110A Automatic Electron-Tube Tester

Order all parts by stock number through a local RCA distributor.

Symbol No.	Description	Stock No.
	Capacitors	
C1	Electrolytic, dry: 100 μf ±50% −10%, 150 v	210189
C2	Electrolytic, dry: 500 μf ±50% −10%, 25 v	99151
C3 C4	Electrolytic: 100 μf, 25 v	79751
C5 C6 C7	Tubular, paper: 0.47 μf ±20%, 400 v	73553
	* * * * * *	
CR1 CR2	Rectifier, selenium: 130 v, 65 ma	215415
CR3 CR4	Rectifier, selenium: 20 v, 75 ma	215416
CR5	Diode, crystal: type 1N60	76675
F1	Fuse: 1 amp, 250 v	14183
I1	Lamp, neon: type NE-51	101857
M1	Meter: 0-100 μamp	215409
	Resistors	
R1	Composition: 2400 ohms ±5%, ½ w	502224
R2	Composition: 62 ohms ±5%, ½ w	3579
R3	Variable, wire wound: 50 ohms ±20%, 1½ w	215825
R4	Composition: 24 ohms ±5%, ½ w	502024
R5	Composition: 120 ohms ±5%, ½ w	502112
R6	Composition: 56 ohms ±5%, ½ w	502056
R7	Composition: 68 ohms ±5%, ½ w	502068
R8	Composition: 510 ohms ±5%, ½ w	502151
R9	Composition: 150 ohms ±5%, ½ w	502115
R10	Composition: 100 ohms ±5%, ½ w	502110
R11	Composition: 120 ohms ±5%, ½ w	502112
R12	Composition: 82 ohms ±5%, ½ w	502082
R13	Composition: 47 ohms ±5%, ½ w	502047
R14	Composition: 51 ohms ±5%, ½ w	502051
R15	Composition: 47 ohms ±5%, ½ w	502047
R16	Composition: 100 ohms ±5%, ½ w	502110
R17 R18	Composition: 3300 ohms ±5%, ½ w	502233
R19	Composition: 2700 ohms ±5%, ½ w	502277
R20	Composition: 2200 ohms ±5%, ½ w	502222
R21	Composition: 1500 ohms ±5%, ½ w	502215
R22	Composition: 1200 ohms ±5%, ½ w	502212
R23	Composition: 1000 ohms ±5%, ½ w	502210
R24	Composition: 330 ohms ±5%, ½ w	502133
R25	Composition: 750 ohms ±5%, ½ w	19785
R26	Composition: 3300 ohms ±5%, ½ w	502233
R27	Composition: 43 ohms ±5%, ½ w	502043
R28	Composition: 91 ohms ±5%, ½ w	502091
R29	Composition: 300 ohms ±5%, ½ w	502130
R30	Composition: 56 ohms ±10%, ½ w	502056
R31 R32	Composition: 10,000 ohms ±10%, 2 w	522310
R33	Composition: 15 ohms ±10%, ½ w	502015
R34	Variable: wire wound, 125 ohms ±10%, 25 w	215411
R35	Composition: 330 ohms ±5%, ½ w	502133
R36	Carbon film: insulated, 10 ohms ±1%, 1 w	215410
R37 R38	Composition: 2.7 meg ±10%, ½ w	72788
R39	Composition: 56,000 ohms ±10%, ½ w	502356
R40	Composition: 2700 ohms ±5%, ½ w	502227
R41	Variable, carbon: 10,000 ohms ±20%, ¼ w	215414
R42	Composition: 10 ohms ±10%, ½ w	502010
R43	Composition: 820 ohms ±5%, ½ w	502182
R44	Variable, carbon: 1500 ohms ±20%, ¼ w	215412
R45	Variable, carbon: 5000 ohms ±20%, ¼ w	215413
R46	Composition: 150,000 ohms ±10%, ½ w	502415
R47	Composition: 390 ohms ±5%, ½ w	30498
S1	Switch, rotary: 2 sections, 6 positions, 7 circuits	215404
S2	Switch, lever: 2 poles, 3 positions, spring return	215520
S3	Switch, lever: 2 poles, 2 positions, spring return	215405
S4	Switch, micro	215406
S5	Switch, push button: DPDT, non shorting	215427
S6	Switch, snap: SPST	215674
T1	Transformer, power	215407

Symbol No.	Description	Stock No.	Symbol No.	Description	Stock No.
	Miscellaneous			Jewel, pilot lamp	208080
T2	Transformer, current: variable, 60 cps	215408		Knob, control	212148
XF1	Holder, fuse	48894		Knob: for lever switch	215419
	Board, printed circuit: front	215396		Knob: for actuating lever	215420
	Board, printed circuit: back	215397		Panel, front	215388
	Board, pressure	215398		Pin, contact: for printed circuit board	215395
	Bracket: for printed circuit board	215389		Rod, card retaining	215401
	Bracket: for actuating shaft	215390		Shaft, actuating	215391
	Bushing, knurled: for card holder clamping stud	215403		Socket, tube: 7 pin	94925
	Cam, actuating	215392		Socket, tube: 9 pin	94926
	Case, carrying: complete with handle	215387		Socket, tube: octal	215417
	Card, master punch	215426		Socket, tube: loctal	215418
	Collar: for actuating shaft	215393		Socket, pilot lamp	43734
	Cord, power: 72″ long, with plug	70392		Spring, card guide strip	215402
	Eyelet, pin contact washer	215422		Spring, pin contact	215421
	Handle, carrying case	215424		Spring, pin: for actuating shaft	215423
	Holder, card: complete assembly	215399		Spring, card clamping stud	215425
				Straightener, pin: 7-pin	209583
				Straightener, pin: 9-pin	209584
				Stud, pivot: for pressure board	215394
				Stud, clamping: assembly for card holder	215400

Accessory Socket Adapters for WT-110A

Certain tube types which have bases and pin arrangements different from those provided for on the WT-110A may be tested if an appropriate tube-socket adapter is used. These adapters, which plug into the octal socket on the WT-110A panel, are available on separate order through a local RCA distributor. The following set and individual adapters are available:

RCA WG-337A Tube Socket Adapter Set
4 adapters for Testing Tubes with Small 4-Pin bases, Small 5-Pin bases, Small 6-Pin bases, and Small & Medium 7-Pin bases in RCA WT-110A *Automatic* Electron-Tube Tester

RCA WG-338A Tube Socket Adapter
For Testing 7-Lead In-Line Subminiature Tubes in RCA WT-110A *Automatic* Electron-Tube Tester

RCA WG-339A Tube Socket Adapter
For Testing 8-Lead Circular Subminiature Tubes in RCA WT-110A *Automatic* Electron-Tube Tester

20 per cent of indicated values. If voltages are measured from top of front panel, count tube pins in a counterclockwise direction around tube socket.

1B3-GT	
PIN NO.	VOLTAGE
1 (NC)	0
2 (F)	0
3 (IC)	0
4 (NC)	0
5 (IC)	0
6 (NC)	0
7 (F)	1.25v ac
8 (IC)	0
TOP CAP (P)	50v ac

5V4-G	
PIN NO.	VOLTAGE
1 (NC)	0
2 (H)	5v ac
3 (NC)	0
4* (P2)	18v ac
5 (NC)	0
6 (P1)	18v ac
7 (NC)	0
8 (H, K)	0

6AL5	
PIN NO.	VOLTAGE
1 (K1)	0
2* (P2)	5v ac
3 (H)	6.3v ac
4 (H)	0
5 (K2)	0
6 (NC)	0
7 (P1)	5v ac

6BQ6-GTB/6CU6	
PIN NO.	VOLTAGE
1 (NC)	0
2 (H)	6.3v ac
3 (NC)	0
4 (G2)	+110v dc
5 (G1)	−12v dc, 1v ac
6 (NC)	0
7 (H)	0
8 (K)	0
TOP CAP (P)	+110v dc

12AD6	
PIN NO.	VOLTAGE
1 (G1)	1v ac
2 (K)	0
3 (H)	12.6v ac
4 (H)	0
5 (P)	+13.5v dc
6 (G2G4)	+13.5v dc
7 (G3)	0

*Voltage is applied only when PLATE switch is set to "P2" position.

Internal Adjustments

If any internal indjustments must be made, the following complete procedure should be followed. Calibration requires that the panel be removed, as described at the beginning of the Maintenance Section. Locations of internal adjustments are shown in Figure 6.

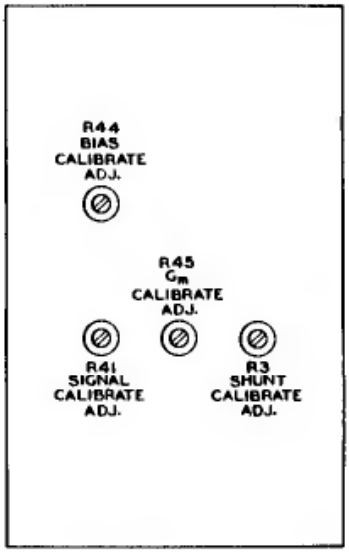


Figure 6. Locations of internal adjustments in WT-110A.

1. Install the card only for the 6BQ6-GT. Set the SELECTOR to "CAL".

2. Connect the direct probe of an ac voltmeter to switch contact 9 of switch section S1A (junction of R35 and R40). (NOTE: A high-impedance ac voltmeter having a full-scale accuracy of ±2% or better is required. Use the 1-volt or 1.5-volt range).

3. Adjust the CALIBRATE control for exactly 1-volt reading on the meter.

4. Set the SELECTOR to "CAL" and push the CAL/TEST switch to the "CAL" position. The WT-110A meter pointer should rest exactly at the center-scale "CAL" mark when the panel is mounted in its normal horizontal "up" position. If the reading is not correct, adjust R41 to bring the pointer to the exact center-line position.

5. Connect the dc probe of a dc voltmeter to pin 5 of any tube test socket. Adjust the Bias Calibrate control, R44, for exactly −12 volts.

6. Move the dc probe to contact 10 on switch section S1A. Turn the SELECTOR to "GAS". The meter should indicate −3.8 volts dc. If the voltage is incorrect, check value of R35.

7. Push the SPECIAL LEAKAGE/GAS switch. The measured voltage should change from −3.8 to −2.6 volts. If the voltage is incorrect, check value of R47. Disconnect the voltmeter.

The above procedure completes the internal bias-calibration adjustment.

The following procedure is used to adjust the internal gm-calibrating circuit.

NOTE: The following equipment is needed for gm calibration:

a. A high-impedance ac millivoltmeter with an accuracy of ±2% or better.

b. A Variac.

c. A filament transformer.

1. Remove the 6BQ6-GT card from the card slot and insert the card only for the type 1AX2. *Remove the power plug from the power outlet.*

2. Set the SELECTOR control to "P" on "SHORTS/LEAKAGE".

3. Connect the Variac and filament transformer in combination so the output voltage from the transformer can be adjusted over a range from 0 to 5 volts.

4. Connect the output from the transformer to the primary of the current transformer T2 in the WT-110A with the 10-ohm resistor (R36) in series. One of these connections can be made at the terminal board next to T2. The other connection can be made to the red lead connected to contact 11 of S1C.

5. Connect the direct probe of the millivoltmeter across R36. Adjust the Variac to produce a reading of 0.01 volt on the voltmeter. The meter pointer on the WT-110A should read exactly full scale. If the pointer is above or below this mark, adjust R45 (gm calibrate adj.) for exactly full-scale reading on the WT-110A. If full-scale deflection cannot be obtained, or if full-scale deflection is obtained only at the extreme end of the control range, replace rectifier CR5.

6. Remove the 1AX2 card and insert the card only for the 12AX4-GT, -GTA. The power plug should be removed from the power outlet and the voltmeter connected as in step 5.

7. Adjust the Variac for a reading of "7" on the WT-110A meter. The ac voltmeter should indicate 440 millivolts ±5%. If the reading is not 440 millivolts, adjust R3. Continue to adjust the Variac and R3 in combination until simultaneous readings of "7" on the WT-110A meter and 440 millivolts on the ac voltmeter are obtained.

Lubrication of the Matrix

A lubricant should be used to lubricate specified points in the matrix. Apply the lubricant to all four pressure surfaces on the cams as well as to points of the shaft bearings and the sliding plates.

Test Equipment Service Report

Date _____ 19 ___

Name of instrument _____ Type No. _____ Serial No. _____

Is instrument believed to be in warranty? ☐ Yes ☐ No

Description of trouble:

What appears to be wrong? _____

_____

_____

Which controls do not work? _____

_____

Check one:

☐ Repair without quoting cost ☐ Quote cost before making repairs

Owner:

_____
Name

_____
Street

_____
City Zone State

THIS SPACE FOR DISTRIBUTORS ONLY:

☐ Ship instrument to distributor

☐ Ship instrument directly to owner

☐ Instrument is for stock

_____
Dist. Name

_____
Street

_____
City Zone State

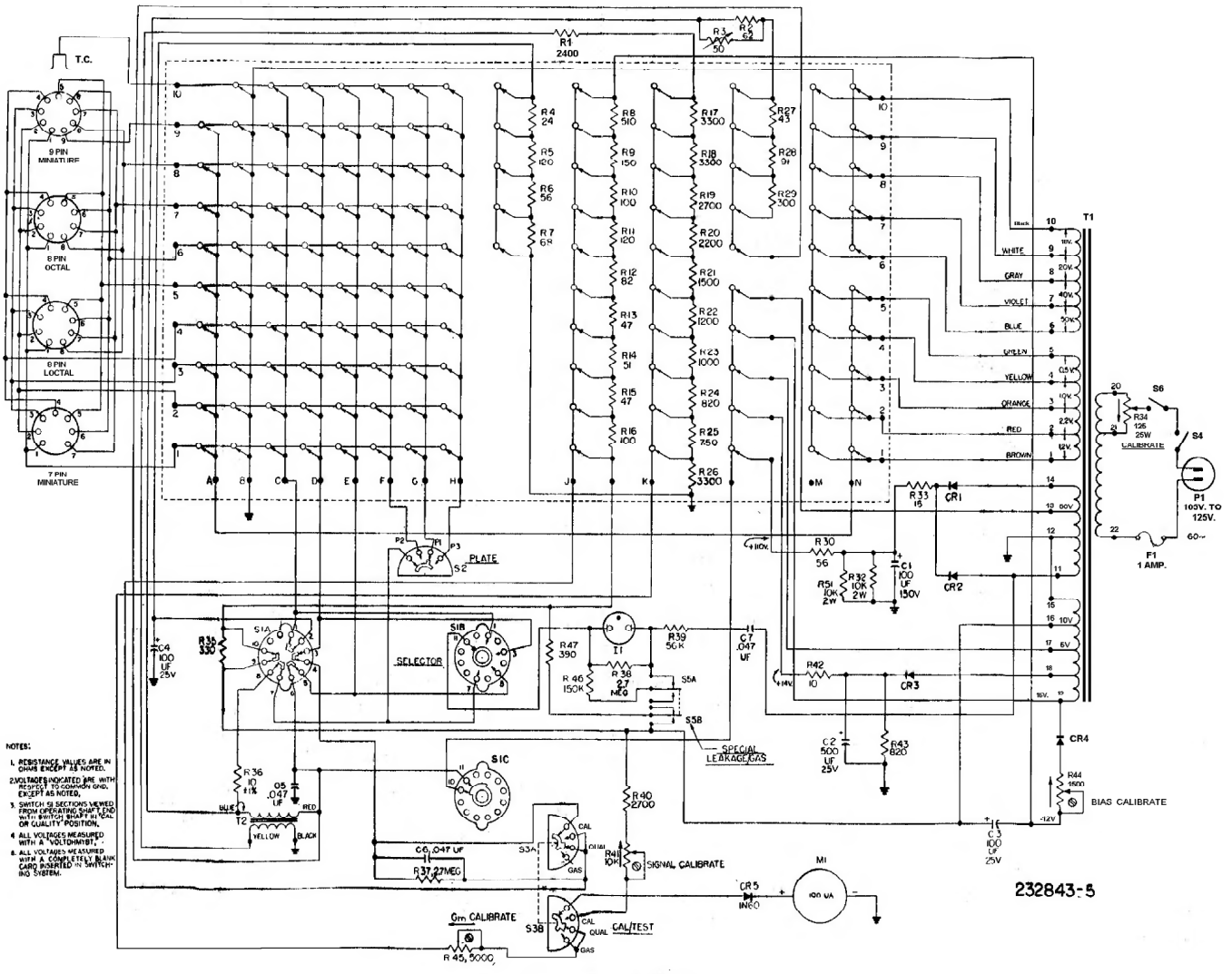
To avoid delay in repairs:

1. Be sure to enclose all test leads and probes with instrument.
2. Pack carefully to avoid damage in shipment; test equipment is delicate.
3. Do *not* ship by parcel post. Use railway express or motor freight.
4. Retain a duplicate of this report. Enclose original copy with equipment.
5. Ship instrument prepaid to:

RCA SERVICE CO., INC.
Return Apparatus Control
Building 8-2
Camden, New Jersey

1CE-106A

(Cut along this line)



Schematic diagram of WT-110A

Warranty

Radio Corporation of America warrants its test and measuring equipment, when properly registered, against defects in workmanship, materials, and construction under normal use and service for a period of one year from the date of original purchase. Under this warranty, our obligation is limited to repairing or replacing any defective parts.

This warranty does not apply to any instrument which has been tampered with in any way, or which has been misused or damaged by accident or negligence, or which has had the serial number removed, altered, or effaced.

RCA tubes and RCA batteries used in such equipment are covered by our standard tube or battery warranty.

Electron Tube Division
RADIO CORPORATION OF AMERICA
Harrison, New Jersey

This warranty is valid only when the card enclosed with the instrument is properly filled in and returned for registration.